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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

09/870,926

05/30/2001

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01827.0050.00US00

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04/20/2006

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C/O IP DOCKETING DEPARTMENT

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EXAMINER

ODOM, CURTIS B

ART UNIT

PAPER NUMBER

2611

DATE MAILED: 04/20/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|--------------------------------|--|
| Office Action Summary | Application No. 09/870,926 | Applicant(s) KRIEGER ET AL. | |
| | Examiner Curtis B. Odom | Art Unit 2634 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 February 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-49 is/are rejected.
- 7) ☒ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 May 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 1-49 recite the limitations “A system/method for estimating a signal-to-noise ratio related parameter “ of “A system/method for scaling a symbol with a scaling factor derived from an estimate of a signal-to-noise related parameter”. However, the claims do not recite how the signal-to-noise related parameter is estimated. The claims recite limitations such as “associating (correlating) the count with a value of the signal-to-noise ratio related parameter” but do not recite how this association (correlation) provides an estimation of the signal-to-noise ratio related parameter.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

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such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-5, 18, 24-28, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Fukuhara (U. S. Patent No. 4, 27, 103).

Regarding claim 1, Regarding claim 1, Farques et al. discloses a system for estimating an SNR-related parameter comprising:

first logic (Fig. 6, block 64, column 4, lines 49-column 6, line 25) for determining a count of the number of received symbols in a predetermined number of received symbols that fall within one or more predetermined sample collection areas (Fig. 3 and Fig.4) and determining an SNR-related parameter from this count Fig. 6, block 63, column 6, lines 3-25).

Farques et al. does not disclose a second logic for associating the count with a value of the SNR-related parameter.

However, Fukuhara discloses a first logic (Fig. 4, blocks 5, 6, and 9) for counting a number of received symbols (sample pulses) in a received signal (column 3, lines 23-40) and a second logic (Fig. 10, column 3, lines 41-51) for associating this count (subtraction count) with a value of an SNR-related parameter (S/N ratio value) stored in memory. Based on the count, an S/N ratio is derived from memory. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the SNR-related parameter estimation of Farques et al. with the teachings of Fukuhara et al. to allow the system of Farques et al. to derive an SNR-related parameter based on associating the count of symbols with value of the SNR-related parameter since Farques et al. states (column 6, lines 12-16) being able to lookup values using memory minimizes the time required for processing.

Regarding claim 2, which inherits the limitations of claim 1, Fargues disclose the symbols are quadrature symbols having in-phase (I) and quadrature (Q) components (column 3, lines 44-55), the one or more collection areas are defined in relation to an I-Q plane, and the first logic determines if a received symbol falls into the one or more collection areas from the I and Q components of the symbol (Fig 3 and Fig. 4).

Regarding claims 3 and 4, Fukuhara further discloses the SNR-related parameter is E_s/N_0 which expressed in dB (Fig. 7, column 1, lines 5-7 and column 3, lines 52-column 4, line 8), wherein $S = E_s$ and $N = N_0$ (wherein the noise power spectral density is derived from the noise power probability density function as shown in column 3, line 52-column 4, line 8).

Regarding claim 5, which inherits the limitations of claim 1, Fukuhara further discloses the second logic associates the count with a value of the SNR-related parameter using one or more lookup tables (column 3, lines 41-52). It would have been obvious to one skilled in the art to include this feature since Farques et al. states (column 6, lines 12-16) being able to lookup values using memory minimizes the time required for processing.

Regarding claim 18, the claimed system includes limitations corresponding to the above subject matter mentioned in claim 1, which is applicable hereto.

Regarding claims 24-28, the claimed method includes limitations corresponding to the above subject matter mentioned in claims 1-5 (wherein correlating is equivalent to associating, which is applicable hereto).

Regarding claim 41, the claimed method includes limitations corresponding to the above subject matter mentioned in claim 1, which is applicable hereto.

5. Claims 13-15, 19-21, 36-38, and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Fukuhara (U. S. Patent No. 4, 27, 103) and in further view of Smallcomb (U. S. Patent No. 6, 484, 284).

Regarding claim 13-15, Farques et al. and Fukuhara discloses the limitations of claims 13-15 (see rejection of claims 1 and 3, wherein correlating is equivalent to associating), except a third logic for scaling a symbol with a scaling factor derived from a value of the SNR-related parameter; a fourth logic for quantizing the scaled symbol, wherein the scaling factor is the value of E_s/N_0 converted into linear terms.

However, Smallcomb discloses logic for scaling a symbol with a scaling factor derived from a value of the SNR-related parameter (Fig. 9, block 904, column 7, line 61-column 8, line 9); logic (Fig. 9, block 902, column 7, line 61-column 8, line 9) for quantizing the scaled symbol, wherein the scaling factor is the value of E_s/N_0 (SNR) converted into linear terms (column 7, line 61-column 8, line 9, wherein $S = E_s$ and $N = N_0$ and the SNR is converted into linear terms as shown in Table 8 under "General Algorithm"). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al. and Fukuhara with the teachings of Smallcomb in order to scale and quantize the symbol to produce an optimal signal estimate using the scaling (α and β) factors (see Smallcomb, column 7, lines 26-44).

Regarding claims 19-21, Farques et al., Fukuhara, and Smallcomb disclose all the limitations of claims 19-21 (see above rejection of claims 13-15) including the system disclosed by Farques et al., Fukuhara, and Smallcomb included in a system with a decoder (see

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Smallcomb, Fig. 9, block 901, column 7, line 60-column 8, line 8). It would have been obvious to one skilled in the art to include a decoder to recover the originally transmitted (source) signal (see Smallcomb, Fig. 2, and column 2, lines 5-9).

Regarding claims 36-38, the claimed method includes features corresponding to subject matter of the above rejection of claims 13-15, which is applicable hereto.

Regarding claims 42 and 43, the claimed method includes features corresponding to subject matter of the above rejection of claims 13-15, which is applicable hereto.

Regarding claims 44 and 45, which inherit the limitations of claim 36, Fargues et al. Fukuhara and Smallcomb do not disclose the method of claim 36 stored as a series of instructions on a processor readable medium including a processor configured to access and execute the series of instructions. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to implement the method of Fargues et al. as software in order to reduce cost and improve the adaptability and flexibility of the system.

6. Claims 16, 17, 39, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Fukuhara (U. S. Patent No. 4, 27, 103) and in further view of Smallcomb (U. S. Patent No. 6, 484, 284) and in further view of Hemmati (U. S. Patent No. 5, 394, 439).

Regarding claims 16 and 17, Farques et al. , Fukuhara, and Smallcomb do not disclose the fourth logic using a uniform quantization delta or the quantization delta is optimized around a predetermined E_s/N_0 value.

However, Hemmati discloses uniform quantization wherein the quantization delta (spacing between quantization levels) is optimized around an SNR (column 10, line 59-column 8,

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line 11, wherein SNR is signal to noise ratio and wherein $S = E_s$ and $N = N_0$). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al., Fukuhara, and Smallcomb with the teachings of Hemmati to provide uniform quantization based on SNR to provide optimal uniform quantization to avoid degradations in bit error rates at specific coding rates (column 8, line 63-column 9, line 7).

Regarding claims 39 and 40, the claimed method includes features corresponding to subject matter of the above rejection of claims 16 and 17, which is applicable hereto.

7. Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Fukuhara (U. S. Patent No. 4, 27, 103) and in further view of Smallcomb (U. S. Patent No. 6, 484, 284) and in further view of Classon et al. (U. S. Patent No. 6, 901, 117).

Regarding claim 22, which inherits the limitations of claim 21, Farques et al., Fukuhara, and Smallcomb do not disclose the decoder comprise a log-MAP decoder.

Classon et al. discloses a log-Map decoder to decoding symbols (column 2, lines 51-60). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al., Fukuhara, and Smallcomb with the teachings of Classon et al. since Classon et al. states that MAP decoders minimizes decoded bit error probability (column 2, lines 51-60).

Regarding claim 23, which inherits the limitations of claim 22, Farques et al. Fukuhara, Smallcomb and Classon et al. do not disclose a second system (receiver system) implemented as one or more integrated circuit chips. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made that systems such as receiver systems are

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implemented into integrated circuit chips to take advantage of the low cost and efficiency (size and implementation) of the chip.

8. Claims 46-49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Farques et al. (previously cited in Office Action 7/27/2005) in view of Fukuhara (U. S. Patent No. 4, 27, 103) and in further view of Smallcomb (U. S. Patent No. 6, 484, 284) and in further view of Sullivan (U. S. Patent No. 6, 201, 817).

Regarding claims 46-49, Farques et al., Fukuhara, and Smallcomb disclose the limitations of claims 46-49 (see rejection of claim 36) including the memory comprising one or more lookup tables (see Fukuhara, column 3, lines 41-52, wherein the lookup table contains S/N ratios) and the scaling operation including one or more arithmetic operations (see Smallcomb, Fig. 9, column 7, line 60-column 8, line 9, multiplication operations). Farques et al., Fukuhara, and Smallcomb do not disclose the system including a state machine comprising of one or more ASIC of synthesized logic for providing control.

However, Sullivan discloses a state machine which controls the memory of a system which comprises of an ASIC (Fig. 1, block 30, column 4, lines 41-51, wherein an ASIC can comprise of hardware logic (synthesized logic) to perform the software functions disclosed). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify the system of Farques et al., Fukuhara, and Smallcomb and implement a state machine as disclosed by Sullivan since Sullivan states the state machine allows the system memory to operate at maximum efficiency (column 4, lines 48-51).

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Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Curtis B. Odom whose telephone number is 571-272-3046. The examiner can normally be reached on Monday- Friday, 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jay Patel can be reached on 571-272-2988. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Curtis Odom
April 15, 2006



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SUPERVISORY PATENT EXAMINER